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Research on the Impact of Digital Economic Development in RCEP Countries on China's Foreign Direct Investment

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Abstract: China's role in the global economy is expanding, with significant growth in foreign investment, especially within the framework of the Regional Comprehensive Economic Partnership (RCEP) consisting of 15 member states. This study examines China's investment patterns in RCEP countries, where the impact of the digital economy on China's Foreign Direct Investment (OFDI) has not been fully explored. Using the Network Readiness Index (NRI) to analyze the digital economic development level of RCEP countries and its impact on China's investment strategies, this study fills this research gap. Dynamic panel data and fixed-effect models are adopted to empirically analyze the direct investment trends of China in 11 RCEP countries over 19 years (2003–2021) and their correlation with digital economic indicators. The research results provide insights for policymakers and enterprises to respond to the changing economic landscape in the RCEP region.

Keywords: RCEP; China's Foreign Direct Investment (OFDI); Network Readiness Index (NRI)

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1. Construction of a model for factors affecting direct investment between China and RCEP countries

1.1. Research methods and model construction

This study investigates the impact of the digital economic development level of RCEP countries on China's Foreign Direct Investment (OFDI) [1]. The global digital economic development index (Network Readiness Index) is introduced. A fixed-effect model is used for empirical analysis of data from 11 RCEP countries (excluding China, Brunei, Laos, and Myanmar) over 18 years from 2003 to 2021. The fixed-effect model eliminates the impact of individual effects to obtain more accurate causal inference, analyzing China's direct investment and digital economic development indicators of RCEP countries. In addition, logarithms are taken for OFDI stock, Network Readiness Index, Gross Domestic Product (GDP), labor force quantity, and geographical distance. Taking

logarithms can convert exponential relationships into linear relationships and reduce data skewness to make it closer to a normal distribution [2].

Thus, the empirical model is constructed as follows:

$$LOFDIjt = f(LNRIit, LGDPJt, LLaborjt, OPENjt, PLRjt, TNRjt)$$

$$LOFDIjt = \beta_0 + \beta_1 LNRIjt + B_2 LGDPjt + \beta_3 LLaborjt + \beta_4 OPENjt + \beta_5 PLRjt + \beta_6 TNRjt + ejt$$

Where j represents host countries (11 countries including Cambodia, Indonesia, Malaysia, the Philippines, Singapore, Thailand, Vietnam, Australia, Japan, South Korea, and New Zealand), t represents time (2003–2021), e is the error term [3].

1.2. Variable definition and data sources

1.2.1. Dependent variable

China's OFDI stock (OFDIjt): Since OFDI flow data may be negative, and stock data can better reflect the motivation and historical process of China's OFDI, to ensure the robustness of the empirical results, this study selects investment stock data from 2003 to 2021 as the dependent variable [4]. Data is obtained from the *Statistical Bulletin of China's Outward Foreign Direct Investment*.

1.2.2. Core independent variable

Digital economic development level of RCEP countries (NRIjt): This study uses the Network Readiness Index (NRI SCORE) of 11 RCEP countries (excluding China, Brunei, Laos, and Myanmar) from 2003 to 2021 as the core independent variable [5]. The NRI, released by the World Economic Forum, evaluates national digital economic development from four major dimensions: Environment Index, Readiness Index, Usage Index, and Impact Index, which is comprehensive and authoritative. Missing data for 2003, 2006, and 2017–2018 is supplemented by linear interpolation [6]. Data is obtained from the World Economic Forum's *Network Readiness Index Report*.

1.2.3. Control variables

The following control variables are listed:

(1) Economic development level (GDPjt): Per capita GDP is used as the indicator to measure economic development level [7]. Generally, the improvement of a country's economic development level expands its market scale, which is more conducive to attracting foreign direct investment. GDP is positively correlated with economic development level; the larger the GDP, the higher the economic development level [8]. Data is obtained from the World Bank Database;

(2) Labor market scale (NLFjt): The total labor force is used as the indicator to measure labor market scale. A large labor force leads to low labor costs, reducing the investment costs of investing countries and thus promoting direct investment in host countries [9]. Data is obtained from the World Bank Database;

(3) Openness (OPENjt): The ratio of the sum of imports and exports of goods and services of country j to GDP. A higher ratio indicates more foreign trade and a higher degree of openness of country j. Data is obtained from the World Bank Database;

(4) Purchasing power parity price level ratio (PLRjt): Used to compare price levels between different countries. Data is obtained from the World Bank Database;

(5) Total natural resources (TNRjt): Calculated as the sum of oil rents, natural gas rents, coal rents, mineral

rents, and forest rents of country j divided by its total GDP. Countries with abundant natural resources, especially energy resources (such as oil and natural gas), are more likely to attract foreign investment. Data is obtained from the World Bank Database.

1.3. Empirical analysis

1.3.1. Preliminary analysis: Descriptive statistics

Statistics are conducted using Stata software, and the results are as follows. As shown in **Table 1**, the average NRI of RCEP countries is 61.4 (data from 2003–2021), but there is a large gap: the lowest NRI is 19.4/100, and the highest is 85.71/100. The average openness (OPEN) is 113.03, with a huge gap between the minimum (21.33) and maximum (437.33), a difference of about 20 times. Notably, the gap in TNR is 87,000 times, indicating significant differences in natural resources among RCEP countries. Overall, RCEP countries showed significant differences in GDP, labor force quantity, openness, price level ratio, and total natural resources from 2003 to 2021 [10].

Table 1. Descriptive statistics

Variable	Obs	Mean	Std. dev.	Min	Max
OFDI	209	666316.1	1203442	980	7344991
NRO	209	61.41907	13.68069	19.4	85.71429
GDP	209	8.57E+07	1.20E+08	816137.1	4.58E+08
Labor	209	4.93E+07	4.86E+07	2898730	1.90E+08
OPEN	209	113.0288	91.60447	21.32613	437.3267
PLR	209	0.61072	0.340377	0.194843	1.588137
TNR	209	3.248051	3.613518	0.000169	13.91969

1.3.2. Preliminary analysis: Correlation analysis

As shown in **Table 2**, except for a certain degree of multicollinearity in the price level ratio (PLR) with a VIF value of 5.2 (above 5), the multicollinearity among other variables is mild. The VIF values of all variables are less than the critical value (10), and the average VIF value is 2.79, far less than 10, indicating that the model has no multicollinearity problem.

Table 2. Multicollinearity test

Variable	VIF	1/VIF
NRI	2.42	0.413594
GDP	3.21	0.311931
Labor	2.49	0.402011
OPEN	2.26	0.44171
PLR	5.2	0.192257
TNR	1.19	0.839133
MeanVIF	2.79	

1.3.3. Hausman test

The Hausman test is adopted to select between the random-effect model and the fixed-effect model based on the test results [11].

As shown in **Figure 1**, the Hausman test yields a prob > chi2 = 0.0005, with a *p*-value less than 0.001, which is significant. Thus, the null hypothesis (random-effect model is valid) is rejected, and the fixed-effect model is selected [12].

The fixed-effect model for panel data is a statistical model used to analyze panel data, considering fixed effects (also known as individual effects or unit effects) in the data. It allows controlling for invariant characteristics among RCEP countries that may affect observed China's OFDI. By introducing individual fixed effects, the model can capture differences among RCEP countries that do not change over time, thereby reducing the impact of omitted variables. Additionally, for variables that vary across individuals but not over time (such as geographical distance, general historical culture, and social systems among countries), the fixed-effect model can incorporate these invariant national-level variables into the model, avoiding estimation errors caused by omitted variables that vary across individuals but not over time [13].

	——— Coefficients ———			
	(b) FE1	(B) RE1	(b-B) Difference	sqrt(diag(V_b-V_B)) Std. err.
lnnri	.7773732	.5971013	.1802719	.1000982
lngdp	-.2409386	-.0136754	-.2272632	.3618638
lnlabor	2.908851	.1979396	2.710912	.8957703
open	-.0043385	-.0043758	.0000373	.0012732
plr	1.03535	1.069795	-.0344451	.1029774
tnr	-.0195258	-.0166877	-.0028381	.0091812
year				
2004	.1162638	.1636255	-.0473617	.0249182
2005	.2264053	.3230464	-.096641	.0455935
2006	.7584681	.8907617	-.1322936	.0634791
2007	.9740454	1.153857	-.1798113	.0753626
2008	1.289868	1.508036	-.2181678	.0913889
2009	1.585481	1.830884	-.2454025	.0868183
2010	1.836876	2.103415	-.2665399	.0973687
2011	2.096283	2.399165	-.3028818	.1159447
2012	2.260581	2.591482	-.3309009	.1225713
2013	2.517246	2.880799	-.3635526	.1364787
2014	2.66574	3.074217	-.4084776	.1542079
2015	2.864923	3.310738	-.4458143	.1652579
2016	2.794212	3.265663	-.4714512	.1771708
2017	3.161852	3.646955	-.4851034	.1941196
2018	3.209699	3.721559	-.5118601	.2094702
2019	3.301328	3.857157	-.5558291	.209792
2020	3.40809	3.941212	-.5331225	.210959
2021	3.484064	4.028145	-.5440814	.23385
_cons	-38.79162	4.048452	-42.84007	13.89322

b = Consistent under H0 and Ha; obtained from **xtreg**.
B = Inconsistent under Ha, efficient under H0; obtained from **xtreg**.

Test of H0: Difference in coefficients not systematic

chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 26.01
Prob > chi2 = 0.0005
(V_b-V_B is not positive definite)

Figure 1. Hausman test. Source: Stata Statistics. Note: b represents the test results of the fixed-effect model; B represents the test results of the random-effect model.

1.3.4. Fixed-effect model

As shown in **Table 3**, from 2003 to 2021, China's OFDI stock showed significant growth with the increase in years. Goodness of fit is an indicator used to evaluate how well a statistical model fits observed data, with two commonly used indicators: R-squared (R^2) and Adjusted R-squared. A high R-value indicates a strong linear relationship, i.e., the relationship between China's OFDI stock and GDP, allowing independent variables to well explain the variation of the dependent variable [14].

Table 3. Regression results

LOFDI	Coefficient	Std. err.	t	*P* > t	[95% conf. interval]		Significance
LNRI	0.777	0.410	1.900	0.059	-0.031	1.586	*
LGDP	-0.241	0.419	-0.570	0.566	-1.068	0.586	
LLabor	2.909	0.898	3.240	0.001	1.136	4.682	**
OPEN	-0.004	0.002	-2.020	0.045	-0.009	0.000	*
PLR	1.035	0.430	2.410	0.017	0.186	1.885	*
TNR	-0.020	0.020	-0.960	0.341	-0.060	0.021	
Year							
2004	0.116	0.182743	0.64	0.525	-0.24441	0.4769417	
2005	0.226	0.206791	1.09	0.275	-0.18174	0.6345459	
2006	0.758	0.218499	3.47	0.001	0.327219	1.189717	***
2007	0.974	0.227228	4.29	0.000	0.525568	1.422523	***
2008	1.290	0.239351	5.39	0.000	0.817463	1.762274	***
2009	1.585	0.228937	6.93	0.000	1.133631	2.037332	***
2010	1.837	0.24338	7.55	0.000	1.356518	2.317233	***
2011	2.096	0.259723	8.07	0.000	1.58367	2.608897	***
2012	2.261	0.263303	8.59	0.000	1.740902	2.780261	***
2013	2.517	0.268814	9.36	0.000	1.98669	3.047802	***
2014	2.666	0.277863	9.59	0.000	2.117324	3.214156	***
2015	2.865	0.281908	10.16	0.000	2.308523	3.421323	***
2016	0.116	0.285578	9.78	0.000	2.230568	3.357855	***
2017	2.794	0.291083	10.86	0.000	2.587344	3.73636	***
2019	3.162	0.29305	11.27	0.000	2.722938	3.879718	***
2020	3.408	0.294256	11.58	0.000	2.81732	3.98886	***
2021	3.484	0.316266	11.02	0.000	2.859852	4.108276	***
_cons	-15.065	4.726	-3.190	0.002	-24.385	-5.746	***

*Note: The last column is the t-value; ***, *, and * indicate significance at the 1%, 5%, and 10% confidence levels, respectively. Logarithms are taken for OFDI stock, Network Readiness Index, GDP, labor force quantity, and geographical distance to strengthen linear relationships, reduce data skewness, and make it closer to a normal distribution.

As shown in **Figure 4**, the goodness of fit is an indicator used to evaluate the degree to which a statistical

model fits the observed data. Two commonly used indicators are R-squared (R^2) and Adjusted R-squared (adjusted R^2). A high R value suggests a strong linear relationship, such as the relationship between China's outward direct investment stock and GDP, allowing the independent variable to explain the variation in the dependent variable well .

Residual standard error: 0.3993 on 174 degrees of freedom
Multiple R-squared: 0.9597, Adjusted R-squared: 0.9518
F-statistic: 121.8 on 34 and 174 DF, p-value: < 2.2e-16

Figure 2. Goodness of Fit.Source: Stata Statistics.

1.4. Mechanism analysis

From the significance test, all explanatory variables pass the significance test except for economic development level (GDP) and total natural resources (TNR) [15]. The specific analysis results of each explanatory variable are as follows:

(1) Digital economic development level of RCEP countries (NRI): The regression coefficient is positive, indicating that the improvement of digital economic development in RCEP countries promotes China's direct investment in them. Quantitatively, for each 1% increase in the digital economic development level of RCEP countries, China's direct investment in RCEP countries significantly increases by 0.777%;

(2) Economic development level (GDP): The regression coefficient is negative, indicating that the economic development of RCEP countries hinders Chinese enterprises' direct investment in them. For each 1% increase in economic development level, China's direct investment in RCEP countries significantly decreases by 0.24%. This is inconsistent with expectations, and the variable fails the significance test, meaning the inhibitory effect of economic development level on Chinese enterprises' investment is not significant;

(3) Labor market scale (Labor): The regression coefficient is positive, indicating that the expansion of the host country's labor market scale reduces labor costs, thereby promoting China's direct investment. Quantitatively, the regression coefficient is significant at the 1% significance level, meaning for each 1% expansion of the labor market scale in RCEP countries, China's direct investment increases significantly by 2.91%;

(4) Openness (OPEN): The regression coefficient is negative, indicating that the increase in the host country's openness hinders attracting Chinese enterprises' investment, which is inconsistent with expectations. A 1% decrease in openness leads to a 0.004% decrease in China's direct investment in the host country;

(5) PPP price level ratio (PLR): The regression coefficient is positive, meaning for each 1-unit increase in the PPP price level ratio of RCEP countries, China's direct investment in RCEP countries increases by 1.03 units. A higher PPP price level ratio in RCEP countries indicates a relatively lower price level and the depreciation of their currencies relative to the RMB, giving Chinese enterprises a cost advantage;

(6) Total natural resources (TNR): The regression coefficient is negative, indicating that the increase in the host country's total natural resources hinders attracting Chinese enterprises' investment, which is inconsistent with expectations. The variable fails the significance test, meaning the promoting effect of the host country's total natural resources on Chinese enterprises' investment is not significant.

2. Conclusions and recommendations

2.1. Research conclusions

Empirical research shows that the digital economic development of host countries indeed helps promote China's foreign direct investment. The level of digital economic development has gradually become an important factor attracting foreign investment and guiding investment decisions. The Chinese government has recognized the importance of the digital economic strategy, encouraging Chinese enterprises to actively enter the international market, and expects to achieve better development of China's digital economy through foreign direct investment. This paper provides recommendations at both the national and enterprise levels to help Chinese enterprises better select countries and regions for foreign direct investment and promote the development of the digital economy in RCEP countries.

2.2. Relevant recommendations

China and RCEP countries need to deeply recognize the importance of digital economic development in promoting foreign direct investment and actively promote the vigorous development of their own digital economies. On one hand, the digital economy can effectively reduce information, transaction, and management costs, alleviating the financial pressure on enterprises. On the other hand, it helps promote industrial structure upgrading, enhance national technological strength, and drive the innovative development of the domestic economy.

Moreover, RCEP countries need to improve relevant laws and regulations, minimize barriers to foreign investment, and create a favorable domestic investment environment. The digital economy places new requirements on government administration in the new era, and there are still deficiencies in digital economic development in various aspects. Governments should not only support and encourage the cultivation and development of the digital industry but also prevent its excessive expansion. Governments of various countries should closely monitor the development trend of the digital economy, scientifically formulate relevant laws and regulations to ensure its legitimate and reasonable development. At the same time, since the digital economy requires more open and transparent information, governments need to appropriately delegate power, simplify cumbersome approval processes and procedures to reduce transaction costs, and build an efficient and clean digital government.

Finally, at the national level, governments should support and encourage the cultivation and development of the digital industry while guarding against its excessive expansion. To achieve the legitimate and reasonable development of the digital economy, governments of various countries need to closely monitor its development trend, scientifically formulate corresponding regulations to ensure fair competition on digital economic platforms and protect user rights and interests. In addition, governments need to appropriately delegate power in the development of the digital economy, simplify cumbersome approval processes and procedures, reduce transaction costs, and establish an efficient and clean digital government. At the enterprise level, to formulate reasonable foreign direct investment strategies, enterprises are advised to carefully select target investment countries based on the current status of global digital economic development.

Disclosure statement

The author declares no conflict of interest.

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